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valuable feature of the book is that important facts have been culled out from a mass of unimportant material; and by no means least in its commendable qualities is the fact that it is actually readable; even the botanical or geological layman may enjoy it if he cares for such things at all. Everyone who reads the first volume will anxiously await the appearance of the second.

HENRY C. COWLES.

Northward Over the "Great Ice": A Narrative of Life and Work along the Shores and upon the Interior Ice-Cap of Northern Greenland in the years 1886 and 1891-1897. By ROBERT E. PEARY. 2 vols. Illustrated. Frederick A. Stokes Co., New York. 1898.

In these two volumes, embracing nearly 1200 pages, Lieutenant Peary has given a graphic account of his entire Arctic work. The story begins with a reconnaissance of the inland ice of Greenland in 1886. The objects and results of this reconnaissance he summarizes as follows:

Objects.—To gain a practical knowledge of the obstacles and ice conditions of the interior of Greenland; to put to the test of actual use certain methods and details of equipment; to make such scientific observations as may be practicable; and to push into the interior as far as possible. (Paper read before National Academy of Sciences at Washington, D. C., April 23, 1886.)

Results.—Attainment of greater elevation than ever before reached on the inland ice; penetration a greater distance than any white man previously; attainment for first time of the real interior plateau of unchanging snow; determination of ruling characteristics of the inland ice from border to interior (see article in *Bulletin Am. Geog. Soc.*, No. 3, 1887, pp. 286-288); securing an invaluable fund of definite practical knowledge and experience of actual ice-cap conditions and necessary equipment, as well as practical knowledge of Arctic navigation and a familiarity with a considerable extent of the Arctic coasts; inception of ideas of pronounced future value, as odometer, sails, etc. The following deductions: Attacks upon the inland ice should be made at a point as far above level of sea as possible, and where the presence of large and rapidly discharging glaciers indicates a rapid ascent to high elevations in close proximity to coast; party should be *small*, and thoroughly accustomed to snowshoes and ski; surface of inland ice offers imperial highway to east coast, and, in case the ice-cap is coëxtensive with the

land, to the northern terminus of Greenland. Proposal of the following prophetic routes: From base of Noursoak Peninsula to head of Franz Joseph Fjord and return; from Whale Sound to northern terminus of Greenland or intersection of ice-cap with east coast—this route the key to the Greenland problem; from Disco Bay to Cape Dan.

The remainder of Vol. I is occupied by the story of the North Greenland expedition of 1891-2. Most of our readers are doubtless familiar with this famous trip across the northern portion of the great ice-cap, but still they will read this authoritative statement by the explorer himself with fresh interest and satisfaction. The author summarizes the objects and results of this expedition as follows:

Objects.—Determination of the northern limit of Greenland overland; the possible discovery of the most practicable route to the Pole; the study of the Whale Sound Eskimos; the securing of geographical and meteorological data.

Results.—The determination of the northern extension and the insularity of Greenland, and the delineation of the northern extension of the greater interior ice-cap; the discovery of detached ice-free land-masses of less extent to the northward; the determination of the rapid convergence of the Greenland shores above the seventy-eighth parallel; the observation of the relief of an exceptionally large area of the inland ice; the delineation of the unknown shores of Inglefield Gulf; and the imperfectly known shores of Whale and Murchison sounds; the discovery of a large number of glaciers of the first magnitude; the first complete and accurate recorded information of the peculiar and isolated tribe of Arctic Highlanders (Dr. Cook); complete and painstaking meteorological and tidal observations (Verhoeff); sledge journey, which is unique in respect to the distance covered by two men without a cache from beginning to end, and in respect to the effectiveness with which those men were able to handle a large team of Eskimo dogs; corroboration of the opinion advanced that the inland ice offered an "imperial highway."

Vol. II opens with a narrative of the expedition of 1893-4, which is memorable on account of the great equinoctial storm encountered, that appears to have been without a recorded parallel even in that land of terrific gales, and that proved disastrous to the undertaking. Among the subsidiary narratives of special interest are the stories of the discovery of the great Cape York meteorite by Peary and the reconnaissance of Melville Bay by Astrup. In this part are also included a summary of the valuable meteorological observations of Baldwin. Then follows an account of the visitation of the *Falcon*,

the return of the larger part of the party, the voyages of the fall and the winter, and the story of the third winter passed in the high north.

The climax of sympathetic interest is reached when Peary comes to tell of his second crossing of the ice-cap in the face of unusual difficulties, and of the scant margin by which he escaped several threatened sources of disaster. The objects and results of the expeditions of 1893-5 are summarized as follows :

Objects.—The delimitation of the detached lands lying north of main Greenland ; the filling in of the remaining gaps in the northern and north-eastern coast line of Greenland ; in the event of favorable conditions, an attempt upon the Pole ; the completion of the detail survey of the Whale Sound region ; continuation of the studies of the Smith Sound Eskimos ; the discovery of the "Iron Mountain."

Results.—The crossing of the inland ice-cap of north Greenland under a most serious handicap of insufficient provisions ; the completion of the detail survey of Whale Sound ; large accessions of material and information in connection with the Smith Sound Eskimos ; the discovery of the "Iron Mountain" or Cape York "Saviksue," and the bringing home of two of those interesting meteorites.

The work is completed by the narrative of the two summer voyages made in 1896 and 1897, whose chief object was the bringing home of the great Cape York meteorite, which was successfully accomplished by the latter expedition.

The work is written in clear and graphic style, and the story is followed with ease and satisfaction by the reader. The narrative moves forward at a steady and rather rapid pace, and is unusually free from tedious passages. The size of the work is not due to needless deployment of details or the introduction of much subjective matter. It is merely an expression of the great amount of work which Lieutenant Peary has done. His aim has been, as stated in the preface, to condense and to avoid all padding. In the main he has avoided exploiting his feelings, a practice quite too much the fashion with Arctic explorers. When he has given them expression it has usually been on occasions that specially invited it, and then with brevity and good taste.

The scientific reader will of course wish that the natural phenomena of that wonderful region had been set forth with greater detail and with more special reference to their scientific bearings, but this would doubtless have been less acceptable to the great mass of readers

for whom the work was written. There is a hint that the scientific results will be specially treated in some later work. The scientist will, however, find this work rich in phenomena of the highest interest, not less in the illustrations than in the text. No work on the great white north has ever been so amply and so accurately illustrated as this. The 800 photographic illustrations tell their own story. Lieutenant Peary was as fortunate as he was industrious in making an unassailable photographic record of his explorations. Neither storms, dangers, nor stress of circumstances seem to have stopped the work of his ever-present kodak. The mechanical execution of the half-tones, while in the main fair, yet leaves something to be desired. Their extreme value would have warranted the use of the best available paper and of the utmost skill in printing. Their execution is sufficiently good, however, to lend an inestimable value and interest to the text.

T. C. C.

United States Geologic Atlas, Folio 41, Sonora, California. 1897.

The folio consists of seven pages of text signed by H. W. Turner and F. L. Ransome, geologists, a topographic map of the district, an historical geology sheet, an economic geology sheet, and a structure section sheet.

The quadrangle represented in this folio lies between the parallels of $37^{\circ} 30'$ and 38° north latitude, and meridians of 120° and $120^{\circ} 30'$ west longitude. It comprises a portion of the western slope of the central Sierra Nevada, chiefly in the foothill region. The quadrangle covers portions of Tuolumne and Mariposa counties, including, also, corners of the valley counties of Stanislaus and Merced. The area is drained chiefly by the Tuolumne and Merced rivers.

The formations are divided into two main groups: The bedrock series, and the superjacent series. The bedrock series is composed of Juratrias and Palæozoic sediments with interbedded lavas and tuffs, and a series of old igneous rocks, chiefly quartz-diorites, serpentine derived from peridotite, and porphyries. The Juratrias rocks are chiefly clay-slates with some sandstone, and are called the Mariposa formation, since the characteristic Jurassic fossils of the formation were first found in Mariposa county. The Mariposa formation is represented by three distinct belts of slates, the most eastern belt of which is remarkable as containing in part the gold-bearing veins of